AD-A163 907 RESEARCH ANIMAL STANCHION AND TRANSPORTER(U) ARMY RESEARCH INST OF ENVIRONMENTAL MEDICINE NATICK MA V A FORTE ET AL. JAN 86 USARIEM-M-12/86 1/1

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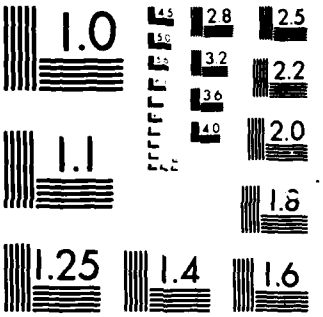

MICROCOPY RESOLUTION TEST CHART
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A stanchion has been designed to restrain mid-size laboratory animals such as goats, dogs, and pigs while performing respiratory and surgical procedures. The restraint device permits control of the animal during induction and recovery from general anesthesia, provides transportation between locations, and constrains the animal during surgery without the need of a shackle device.

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Running Head: Animal restrainer

Title: Research Animal Stanchion and Transporter

Authors: Vincent A. Forte, Jr., M.A.T. and William A. Sawyer, A.S.

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The views, opinions, and/or findings contained in this report are those of the authors and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other official documentation. In conducting the research described in this report, the investigators adhered to the "Guide for the Care and Use of Laboratory Animals" as prepared by the Committee on Care and Use of Laboratory Animals of the Institute of Laboratory Animal Resources, National Research Council.

SUMMARY

A stanchion has been designed to restrain mid-size laboratory animals such as goats, dogs, and pigs while performing respiratory and surgical procedures. The restraint device permits control of the animal during induction and recovery from general anesthesia, provides transportation between locations, and constrains the animal during surgery without the need of a shackle device.

RESEARCH ANIMAL STANCHION AND TRANSPORTER

INTRODUCTION

One crucial element of any research study involving animals is the ability to restrain the animal while data is collected. In small animals, the weight and size of the animal are relatively unimportant factors, but in larger animals the weight and size can make restraint difficult to achieve safely. The use of a restraining device in a research setting is dependent on its versatility, mobility, and effectiveness under a variety of laboratory conditions. Stanchions, available at present for large animals, are not suitable for restraining mid-size animals under a variety of laboratory conditions. There have been no designs reported in the literature for stanchions to restrain mid-size animals in the research laboratory.

Large animal restraining devices became a reality in the early 1880's to restrain cattle and horses for the purposes of shoeing, tatooing, and performing various veterinary procedures (1,2,3,4). These devices were useful in those roles, but have limitations when applied to mid-sized animals in a research setting. Many of these stanchions are not free-standing (i.e., they require a stall to be functional), are not portable, cannot be used to transport animals, have non-adjustable stanchion bars, and lack a means to support an anesthetized animal. Newer designs for larger animals eliminate some of these problems, but are not suitable for mid-size animals such as goats and sheep, which are widely used in research.

The research animal stanchion presented in this paper was designed for goats to control movements without squeezing or shackling the animal.

MATERIALS AND METHODS

The stanchion is constructed entirely of stainless steel to prevent chemical decomposition and eliminate the hazards inherent with other materials. Stainless steel also allows the device to be easily disinfected prior to surgical procedures.

The main frame of this stanchion (Fig. 1) is constructed with welded 3.81 cm stainless steel tubing and angle stock. The front section consists of movable vertical poles which clamp around the neck of the animal to restrict its movement. The top of each pole has a interlocking spring-loaded adjustable mechanism. The pole mechanism (Fig. 2A) can be adjusted on the top and bottom of the frame in evenly spaced increments of 1.91 cm. To adjust the head opening, each pole is moved manually by compressing the top end and placing the bottom end into a different slot. The top adjustment does not close completely. A 12.70 cm space is present to accommodate the circumference of the neck of adult goats.

At the rear of the stanchion is a 55.88 x 106.68 cm rectangular door which has pin-type hinges for easy opening and removal. It also has a quick-release pin mechanism which secures this door to the frame while the animal is in the stanchion. On each side of the stanchion are 45.72 x 60.96 cm stainless steel kick shields which have clip-on brackets and are removeable.

Waste products excreted by animals are collected in a large, removable (104.14 x 50.8 x 10.16 cm) 20-gauge stainless steel tray at the base of the stanchion (Fig. 3). The animal stands on the tray during data collection. This tray rests on a perforated 106.68 x 52.07 x 0.318 cm plate which is welded to the basic framework. A durable reinforced vinyl sling (86.36 x 48.26 cm, Fig.

2B) provides support for animals during long experiments, during surgical procedures, and while the animal is recovering from anesthesia. The sling is suspended from the horizontal framework by two 3.81 cm stainless steel tubes with permanently fastened "S" hooks which are spaced 11.11 cm apart along the length of the bar. The sling has eyelets spaced 11.11 cm apart to accept these hooks and position the sling at the right level. The front leg openings measure 7.62 x 17.78 cm, while rear leg openings measure 7.62 x 10.16 cm. Openings are spaced to accommodate a normal goat's legs.

For easy portability, the stanchion has four corrosion-resistant wheels. These wheels allow the stanchion to be used as a transportation device. It has been particularly useful in moving anesthetized animals between rooms on the surgical floor. The wheels have locks to prevent movement during surgical procedures and data collection.

Other equipment, such as transducers, infusion pumps, and bottles of infusion fluids, are attached to the frame with clamps. This eliminates additional racks and tables to mount equipment needed in research investigations.

DISCUSSION

We have used stanchions of this type for 6 years in ventilatory studies with awake animals, and in surgical procedures in anesthetized goats. These animals require restraint to prevent injury to laboratory personnel and to permit easy data collection. This device functions to control mid-size, horned animals without excessive force. It is portable, durable, chemical resistant, and adequate to contain 25 to 65 kg animals. Another characteristic of this stanchion has been that while adequate to use for induction of anesthesia, it

can also be used to transport animals after surgery and contain them while in recovery.

In any experimentation with animals there is a potential for injury, so the restraining device must minimize the chance of its occurrence. The closable metal door and side shields on this stanchion prevent unexpected behavior from resulting in injury. This stanchion provides the researcher with effective safety with the side shields. The side shields also contain body wastes which are excreted during long experiments. These waste products are collected in a metal tray at the base of the stanchion and do not contaminate the working environment.

The stanchion poles are spring-loaded and adjustable to rapidly release or secure the animal. This is extremely important with anesthetized animals who sometimes thrash during recovery. This is also important to the researcher who requires control without shackling. Additionally, this design does not interfere with respiratory measurements in our goats.

The stanchion is made of stainless steel to prevent chemical decomposition when cleaned with a high-pressure-chemical instrument washer. Most other metals eventually decompose when cleaned in chemical washers. Wooden frames are unacceptable, not meeting the American Association of Laboratory Animal Care (AALAC) standards.

With some modifications, this stanchion can be used with other research animals such as dogs and pigs. Design changes would involve the stanchion poles and the sling. The poles should be shortened and the ability to taper can be eliminated. The spacing between the poles could be equal, whereas in horned animals the space at the top is wider because these animals like to move their

heads up and down and also aides in preventing escape. This does not allow the goat to escape because of its horns. In the dog and pig, the spacing must be equal to prevent backward movement. The sling requires adjustments for the legs of each species placed in the stanchion. The size of the opening for front and rear legs should be tailored to the animal, and the distance between each set of legs must be measured for proper clearance. Normally, 2.5 cm spacing is provided around the circumference of the leg for comfort and to prevent hemostasis in the leg. The normal length of the leg and the space between the legs should be measured and changes made for proper use. The sling can be used with animals of varying heights. Quick-release pins are used to raise or lower the side bars and adjust the sling height. In dogs, the sling is an important control mechanism because it independently separates movement of the legs, whereas the stanchion poles may not be as useful. In horned animals, both of these devices are used, but the stanchion poles are the most important aspects of its design.

CONCLUSIONS

Stanchions are a very important device in animal research and surgery. The stanchion described has proven to be a useful tool for induction and recovery from general anesthesia in addition to its use for daily treatments and procedures. It can be used with four-legged animals of various sizes and weights for a variety of procedures. Modifications can easily be made to allow greater use of this tool in the area of animal science.

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2. Pendleton, L: Horseshoeing stall. U.S. Patent Number 877,947. June 14, 1908.
3. Olinger, T: Animal stock. U.S. Patent Number 1,394,783. October 25, 1921.
4. Linton, B.F: Horse and cattle hoof trimming apparatus. U.S. Patent Number 2,672,126. March 16, 1954.

Figure 1. Dimensional View: Intact Stanchion Main Frame

Figure 2A. Exploded View: Pole Adjustment Mechanism

Figure 2B. Dimensional View: Durable Vinyl Sling

Figure 3. Exploded View: Stanchion Components Description and Measurements of Non-Visible Components Assembled in Figure 1

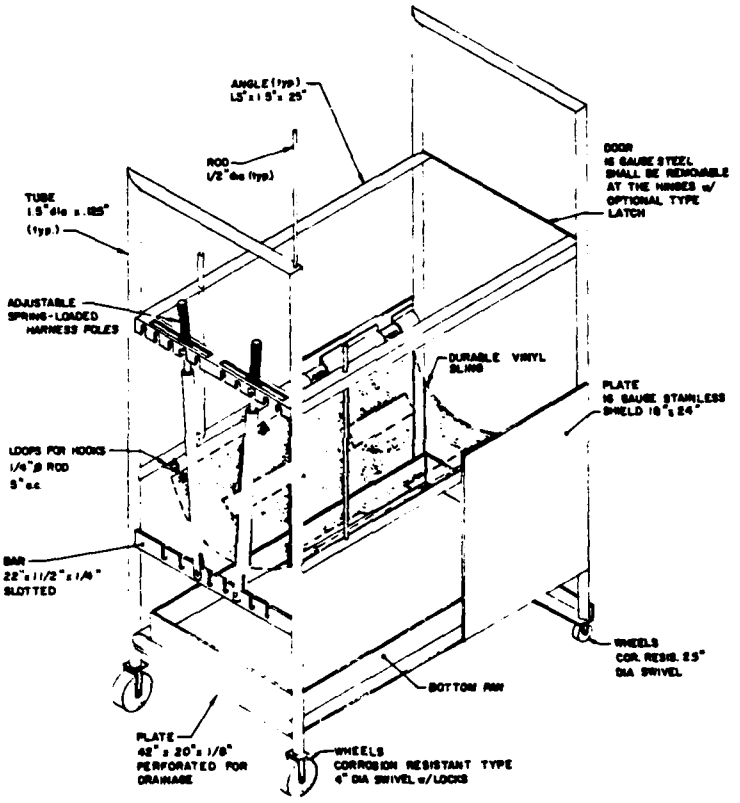
ANGLE (typ)
L5" x 1.5" x .25"
ROD
1/2" dia (typ)
TUBE
1.5" dia x .065"
(typ.)
ADJUSTABLE
SPRING-LOADED
HARNESS POLES
LOOPS FOR HOOKS
1/4" Ø ROD
5" o.c.
BAR
22" x 1 1/2" x 1/8"
SLOTTED
PLATE
48" x 20" x 1/8"
PERFORATED FOR
DRAINAGE
DOOR
16 GAUGE STEEL
SHALL BE REMOVABLE
AT THE HINGES w/
OPTIONAL TYPE
LATCH
DURABLE VINYL
SLING
PLATE
16 GAUGE STAINLESS
SHIELD 18" x 24"
WHEELS
COR. RESIS. 5"
DIA SWIVEL
BOTTOM PAN
WHEELS
CORROSION RESISTANT TYPE
4" DIA SWIVEL w/ LOCKS

FIGURE 1

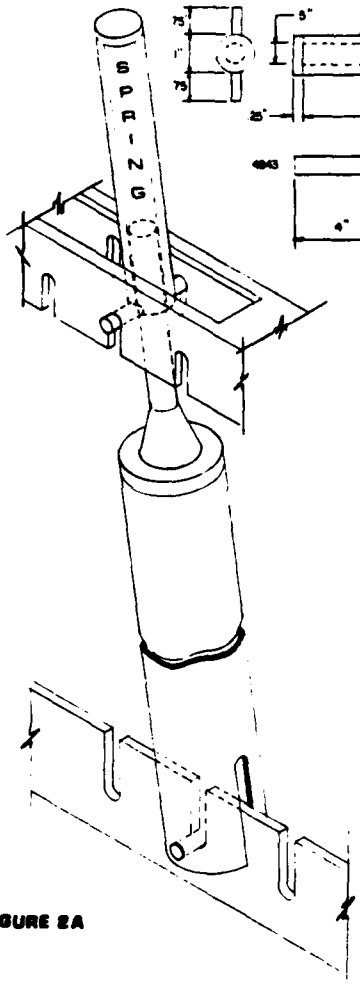

FIGURE 2A

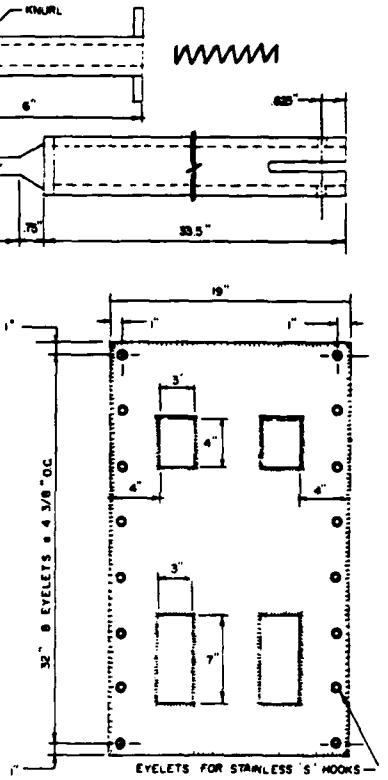

FIGURE 2B

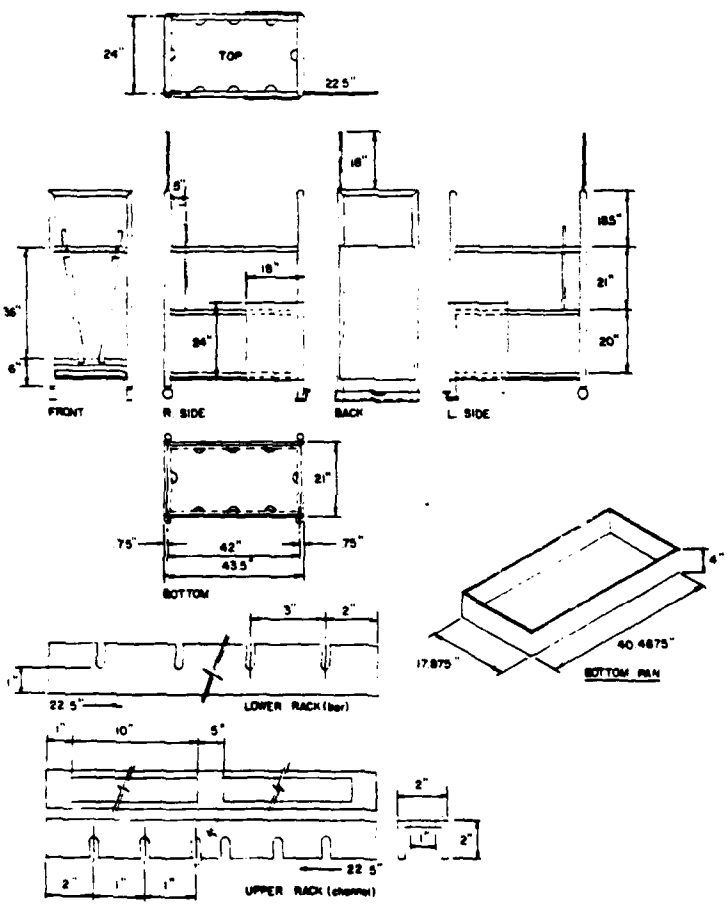
24"
TOP
22.5"
5"
18"
18.5"
21"
20"
16"
6"
18"
24"
FRONT
R SIDE
BACK
L SIDE
21"
75"
42"
75"
43.5"
BOTTOM
4"
40.4875"
17.875"
BOTTOM PAN
3"
2"
1"
22.5"
LOWER RACK (bar)
1"
10"
5"
2"
1"
2"
2"
1"
1"
22.5"
UPPER RACK (channel)

FIGURE 3

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